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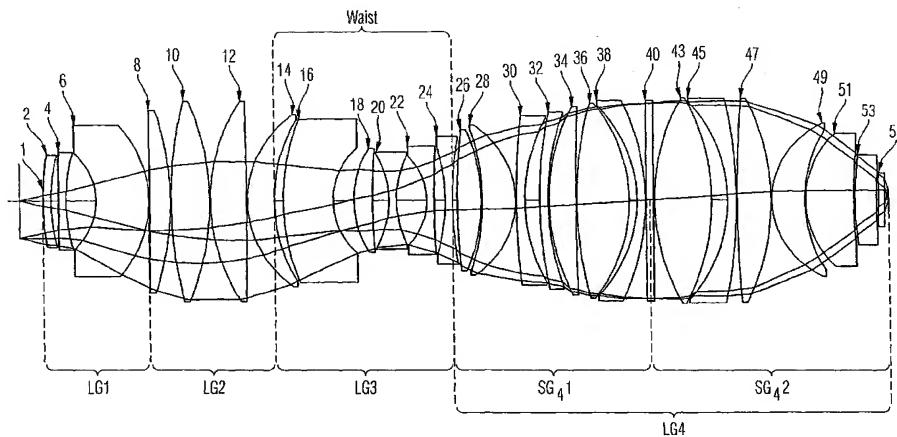
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*[Continued on next page]*

(54) Title: PROJECTION OPTICAL SYSTEM



$$2 \cdot y \cdot \text{NA} \cdot \frac{1}{k} \cdot \sum_{i=1}^k |\phi_i| \geq v_1 \quad (1)$$

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(57) **Abstract:** A projection optical system comprises a plurality of lenses disposed along an optical axis of the projection optical system; wherein the plurality of lenses is dividable into four non-overlapping groups of lenses of positive and negative refractive powers, wherein the following relation (1) is fulfilled: (1) wherein: y is half a diameter in mm of a maximum image field imaged by the projection optical system, NA is a maximum numerical aperture on a side of the second object,  $\phi_i$  is a refractive power in  $\text{mm}^{-1}$  of the  $i^{\text{th}}$  lens, k is a total number of lenses of the projection optical system, and wherein  $V_1$  is greater than 0.045.



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